



BOISE STATE UNIVERSITY



Vocal Activity Patterns of Sympatric Owl Species in Grand Canyon National Park

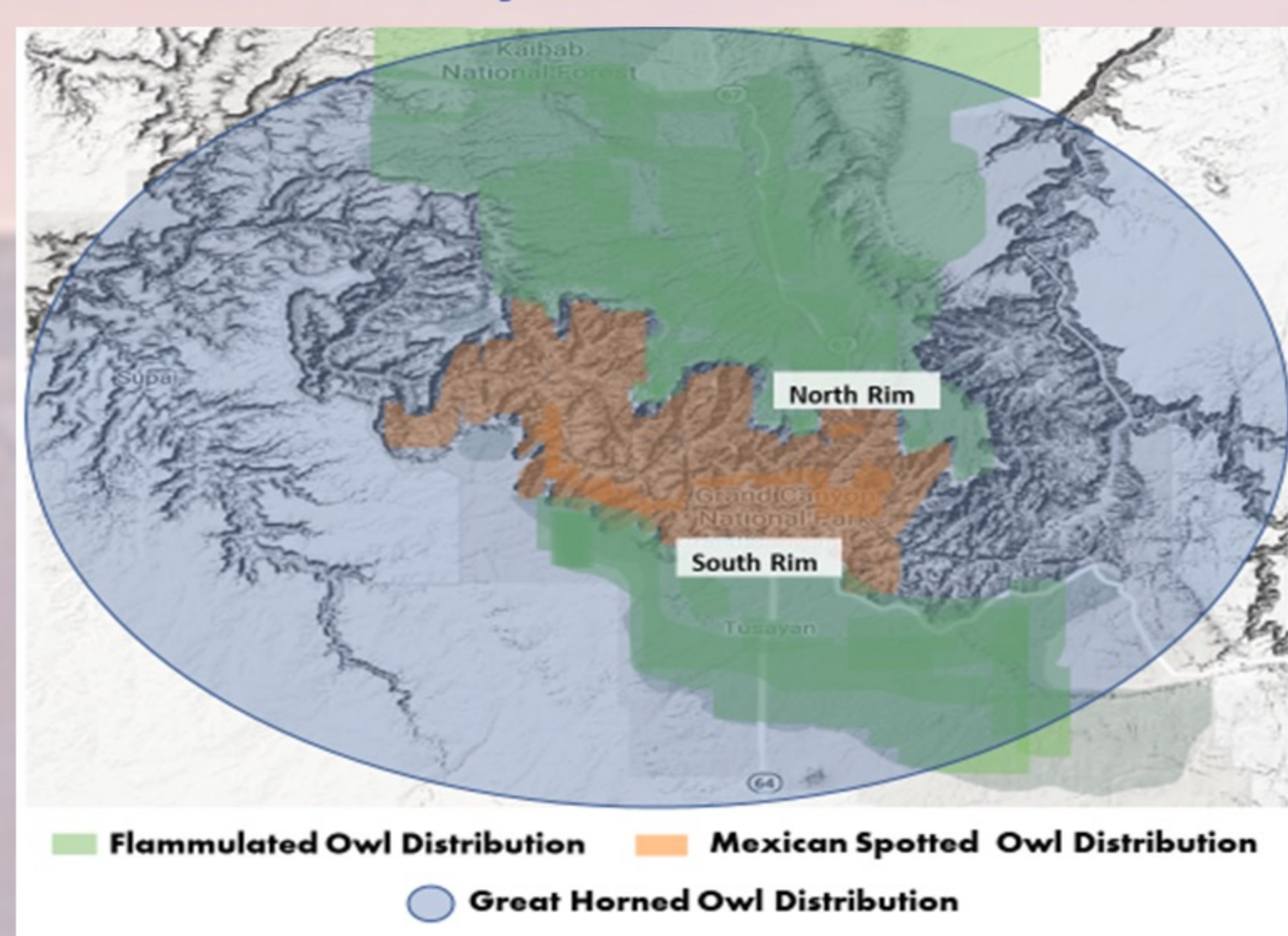
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Introduction

Owls vocalize during their breeding season to find mates, defend territories, and communicate with young. Assessing species' vocal activity times can help identify potential areas of niche overlap, facilitate management and guide monitoring efforts. High levels of overlap may increase competition, while niche partitioning can facilitate species coexistence. We aimed to quantify seasonal and daily vocal activity patterns for 3 owl species at Grand Canyon National Park.



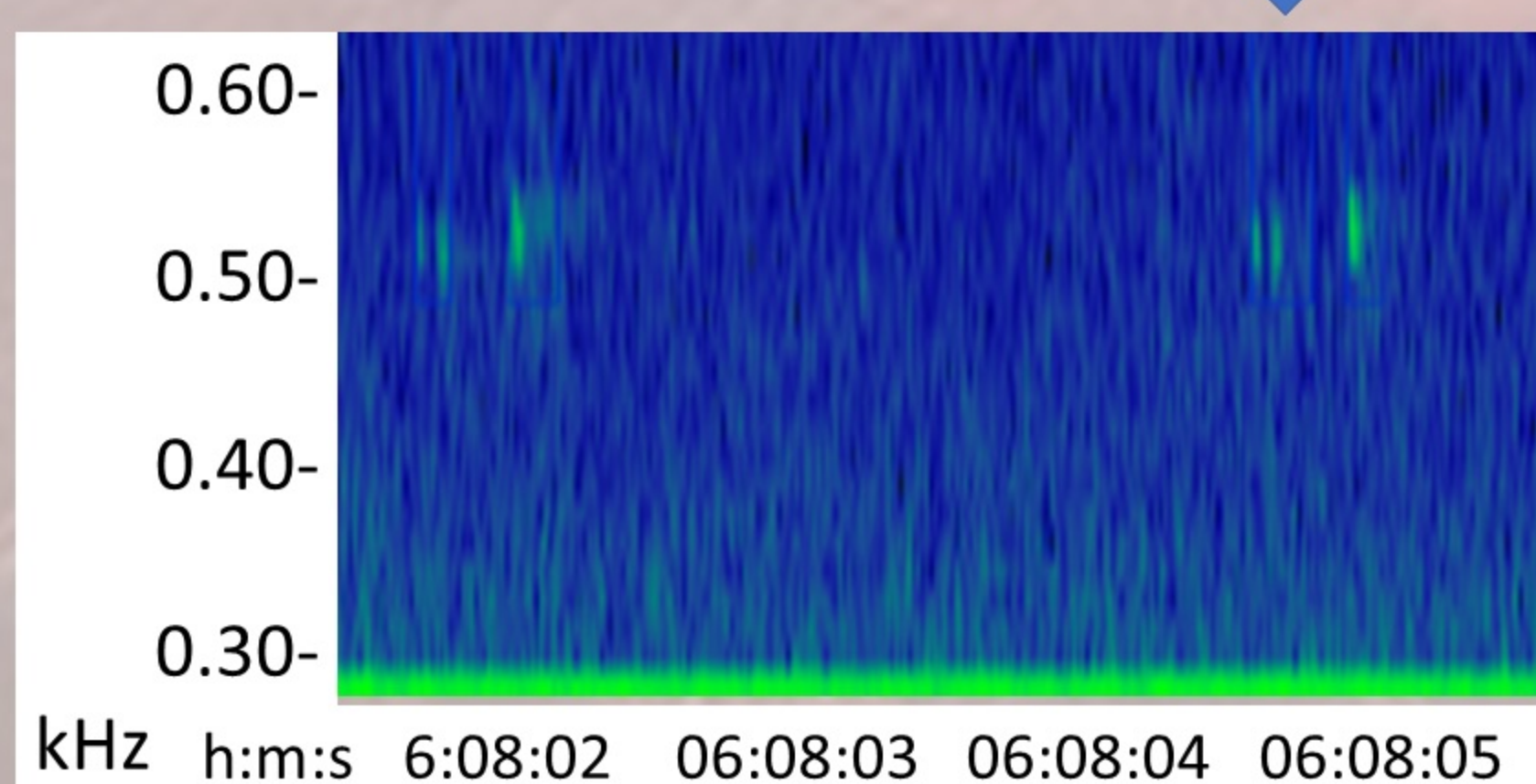
Methods:

Daily Activity

Data collected in 2019, 2020 and 2021 with ARUs, placed in known Mexican Spotted Owl territories by the National Park Service.



Autonomous recording Unit (ARU).



Documented all positive owl vocal detections using RAVEN software.



Created Kernel Density Curves of daily vocal activity patterns using the "Overlap" package in R Program Software

Seasonal Activity

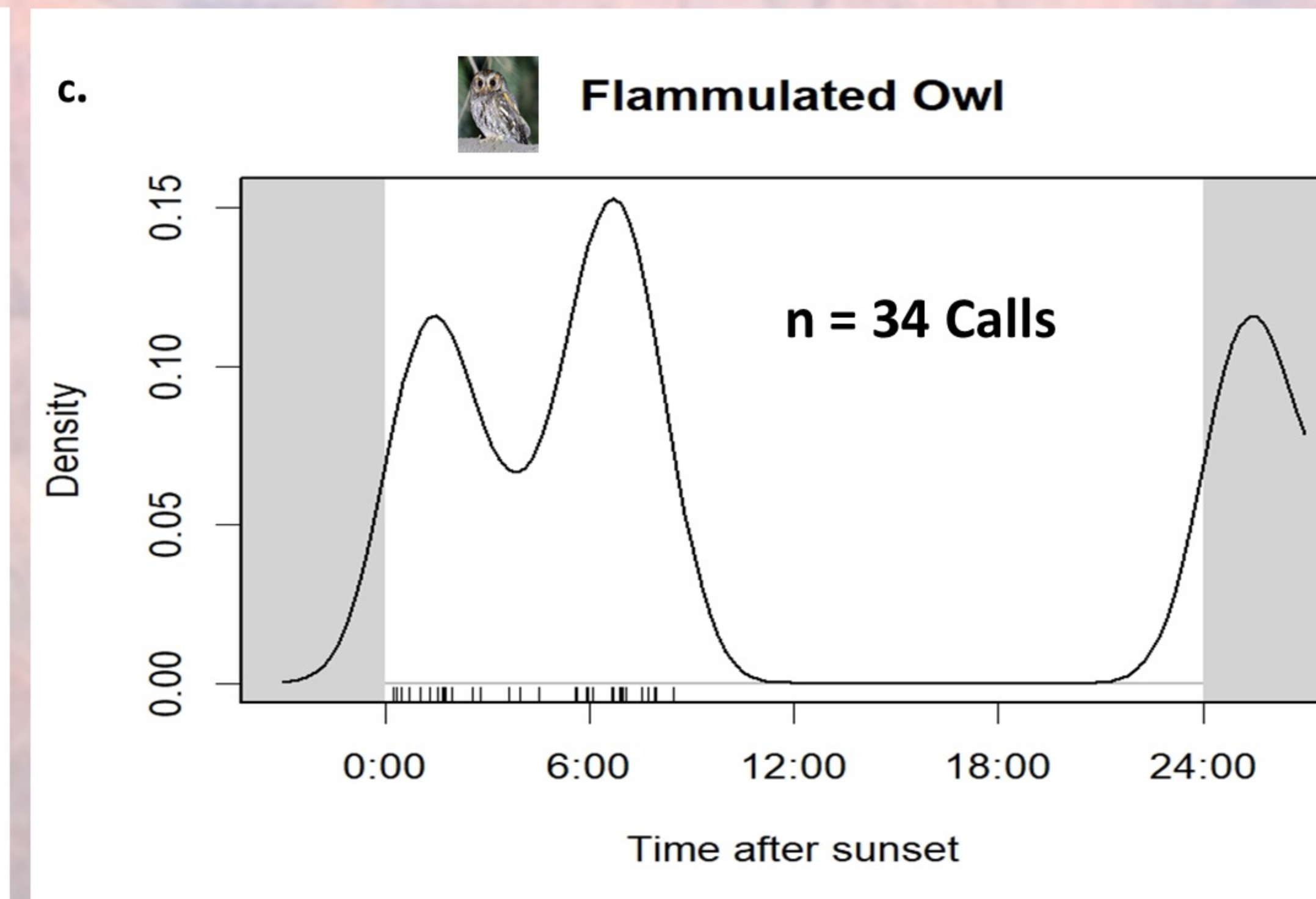
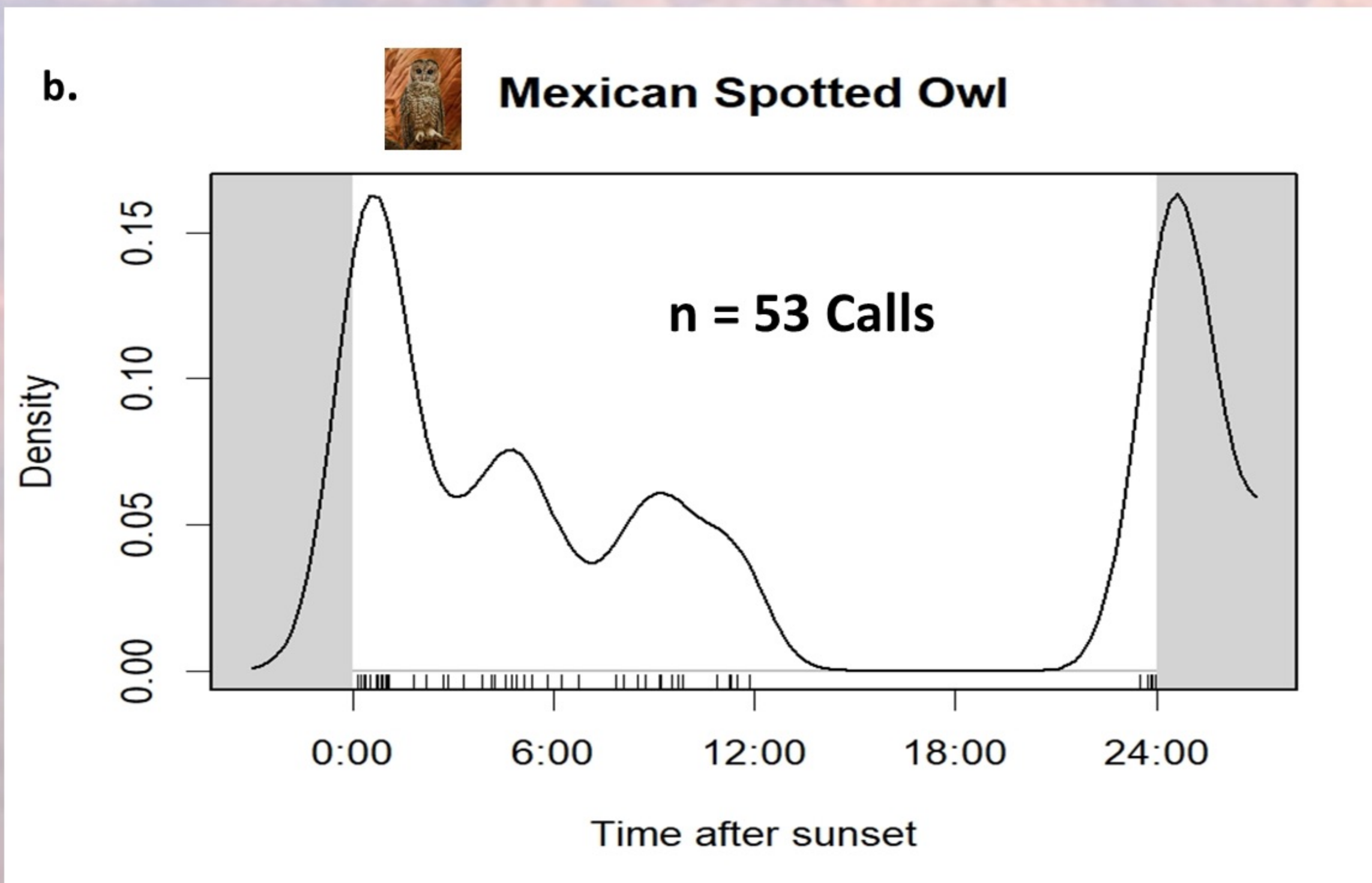
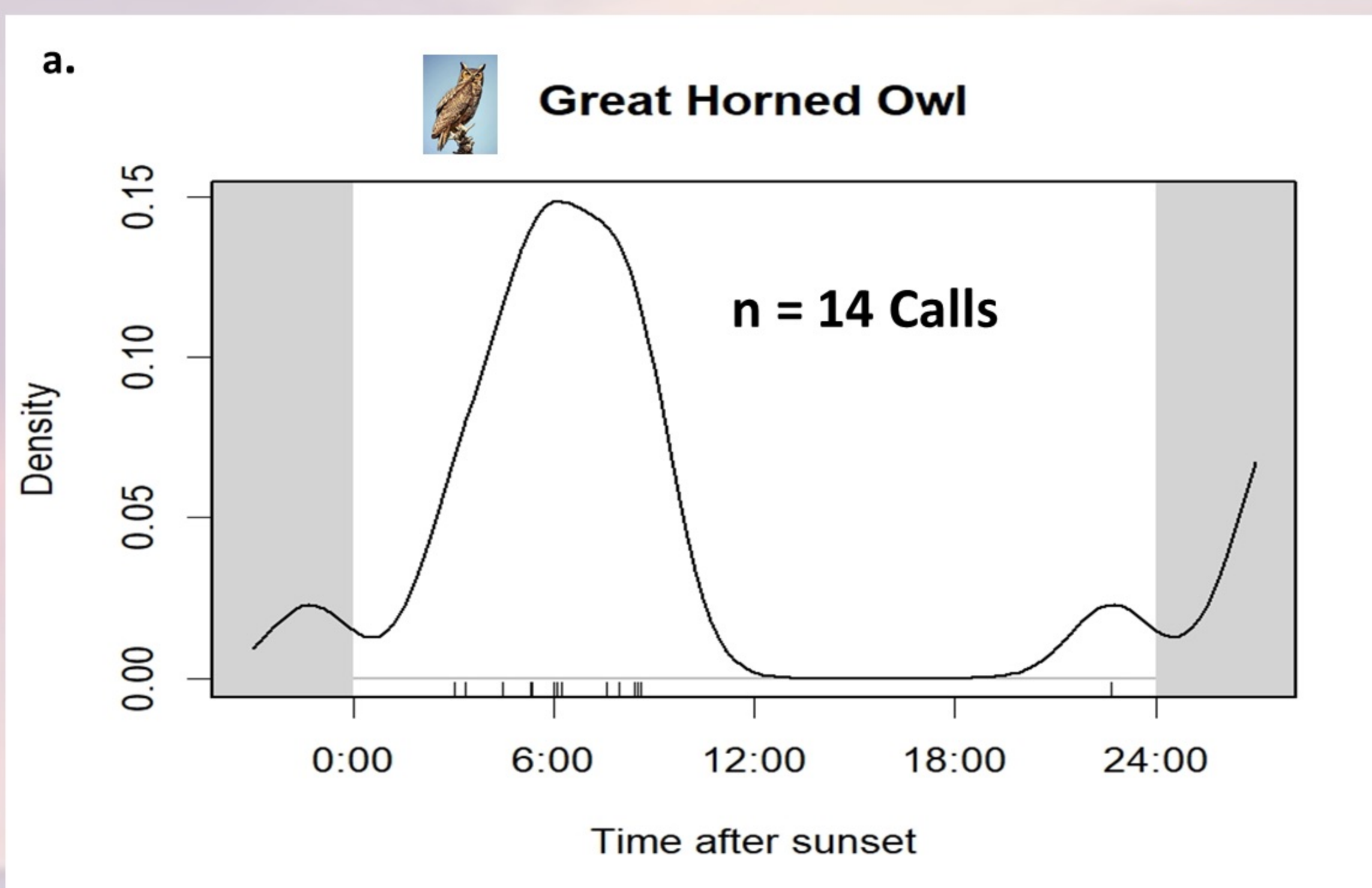
Literature review of species breeding season and peak seasonal vocal activity.



Results:

Daily Activity

Nightly vocal activity peaks ~6 hrs after sunset for Great Horned Owls, ~2 hrs after sunset for Mexican Spotted Owls and ~6 hrs after sunset for Flammulated Owls.

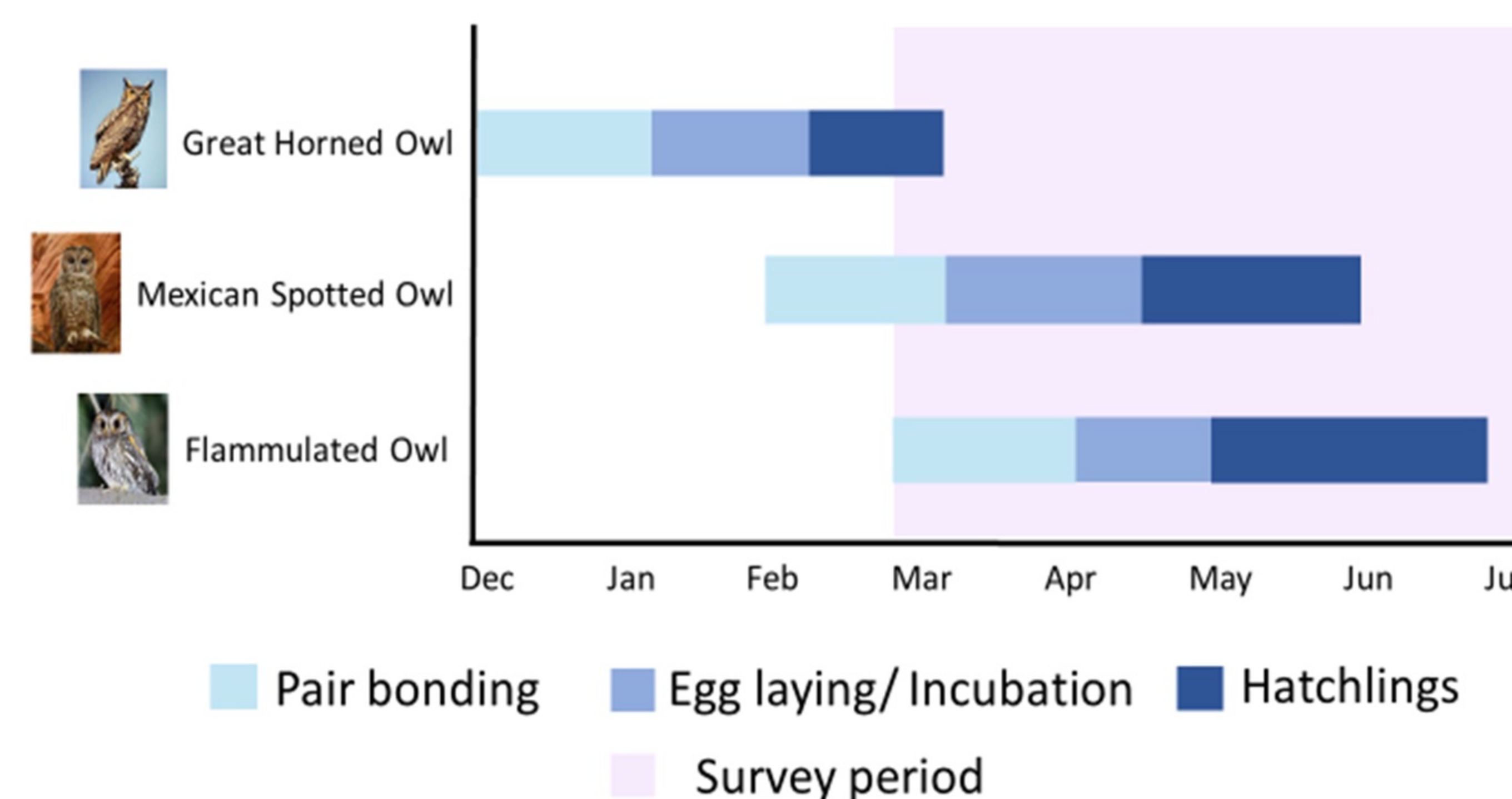


Kernel Density Curves of a. Great Horned Owls b. Mexican Spotted Owls. and c. Flammulated Owls

Seasonal Activity

Great Horned Owls are most vocally active earlier in the year during their pair bonding phase (Dec-Jan). Mexican Spotted Owls are most vocally active during incubation and when hatchlings are present (Mid-Mar to June) while Flammulated Owls are most vocal during pair bonding and incubation (Mar-May).

Breeding Seasons



Breeding seasons of our 3 owl species and current surveying time frame at Grand Canyon National Park

Broader Impacts

Monitoring protocols that rely on detecting vocalizations could focus on recording ~2 and ~6 hrs after sunset, during peak vocal activity that overlaps for the 3 species. Anthropogenic noise should also be minimized at these times to reduce potential disruption of a species' ability to communicate. Seasonally, surveys should target months of Dec to Jun, when all species are most vocally active. Great Horned Owls and Flammulated Owls had the most overlap in their daily activity times, but they were most active at different months of the year. Niche partitioning over multiple axes (i.e., daily, seasonal, spatial) is likely facilitating current coexistence of these 3 owl species at Grand Canyon National Park.

Acknowledgements

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Citations

